WHAT IS CLAIMED IS:

1. A fuel pump for pressurizing fuel to deliver the fuel to a fuel injector of a vehicle engine, which comprises:

a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer on at least one of sliding surfaces which contact with and slide on each other through said fuel or lubricating oil; and

a carbon group film having a hardness higher than a hardness of said hardened layer on a surface of said hardened layer.

2. A fuel pump for pressurizing fuel to deliver the fuel to a fuel injector of a vehicle engine, which comprises:

a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer on one of sliding surfaces which contact with and slide on each other through said fuel or lubricating oil;

a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer on the other sliding surface opposite to said one of the sliding surfaces; and

a carbon group film having a hardness higher than a hardness of said hardened layer on each of surfaces of said hardened layers of said one sliding surface and the other sliding surface.

3. A fuel pump comprising a shaft rotated by driving of a vehicle engine; a cam rotated by the rotation of said shaft; and a plunger reciprocally moved in a cylinder by the rotation motion of said cam through a lifter, said fuel pump pressurizing fuel to deliver the fuel to a fuel injector of the vehicle engine, which comprises:

a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer on at least one of sliding surfaces of said plunger and said cylinder which contact with and slide on each other; and

a carbon group film having a corrosion resistance to said fuel higher than a corrosion resistance of said hardened layer, said carbon group film being formed on a surface of said hardened layer.

4. A fuel pump comprising a shaft rotated by driving of a vehicle engine; a cam rotated by the rotation of said shaft; and a plunger reciprocally moved in a cylinder by the rotation motion of said cam through a lifter, said fuel pump pressurizing fuel to deliver the fuel to a fuel injector of the vehicle engine, which comprises:

a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided

layer on a sliding surface of said lifter contacting with and sliding on said cam through lubricating oil; and

a carbon group film having a hardness higher than a hardness of said hardened layer, said carbon group film being formed on a surface of said hardened layer.

5. A fuel pump comprising a shaft for transmitting rotation from outside; a slant plate for converting the rotation of said shaft to oscillating motion; and a plunger for converting the oscillating motion of said slant plate to reciprocal motion in a cylinder through a slipper, wherein

said slipper is made of an iron group sintered material, and an oxide layer is formed on a surface of said slipper.

6. A fuel pump comprising a shaft for transmitting rotation from outside; a slant plate for converting the rotation of said shaft to oscillating motion; and a plunger for converting the oscillating motion of said slant plate to reciprocal motion in a cylinder through a slipper, wherein

said slipper is made of an iron group sintered material, an oxide layer being formed on a surface of said slipper, a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer being formed on an inner peripheral surface of said cylinder and an outer peripheral surface of said plunger.

7. A fuel pump comprising a shaft for transmitting rotation from outside; a slant plate for converting the rotation of said shaft to oscillating motion; and a plunger for converting the oscillating motion of said slant plate to reciprocal motion in a cylinder through a slipper, wherein

a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer is formed on an inner peripheral surface of said cylinder, and a carbon film or a metal compound is formed on an outer peripheral surface of said plunger.

8. A fuel pump comprising a shaft for transmitting rotation from outside; a slant plate for converting the rotation of said shaft to oscillating motion; and a plunger for converting the oscillating motion of said slant plate to reciprocal motion in a cylinder through a slipper, wherein

said slipper is made of an iron group sintered material, an oxide layer being formed on a surface of said slipper, a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer being formed on an inner peripheral surface of said cylinder, a carbon film or a metal compound being formed on an outer peripheral surface of said plunger.

9. A fuel pump for pressurizing fuel to deliver the fuel to a fuel injector of a vehicle engine, which comprises:

a hardened layer composed of at least one layer selected from the group consisting of a nitrided layer, a carburization-quenched layer and a carbonitrided layer on an inner peripheral surface of a cylinder to serve as a sliding surface of one member; and

a carbon film or a metal compound layer on an outer peripheral surface to serve as a sliding surface of the other member, said sliding surfaces contacting with and sliding on each other through lubricating oil or said fuel, wherein

another member sliding on an end surface of said the other member is formed of an iron group sintered material, ad an oxide layer is formed on a surface of said another member.

10. A direct fuel injection engine comprising a cylinder; a piston reciprocally moving in said cylinder; a fuel injection means for directly injecting fuel into said cylinder; and a fuel pump for delivering said fuel to said fuel injection means, wherein said fuel pump is any one of the pumps described in claims 1 to 9.

11. A direct fuel injection engine according to claim 10, wherein said fuel injection means injects said fuel according to control of a lean-burn condition of an air-fuel ratio above 45.